DEPARTMENT OF NATIONAL DEFENCE
CANADA

OPERATIONAL RESEARCH DIVISION

DIRECTORATE OF OPERATIONAL RESEARCH (CORPORATE AIR MARITIME)

AORT RESEARCH NOTE RN-9701

OPERATIONAL EQUIPMENT RISK ASSESSMENT MODEL (OERAM) - CONCEPT DEVELOPMENT

by

P.E. Desmier
and
Maj C.F. Eidt

FEBRUARY 1997

OTTAWA, CANADA

National Defence Défense nationale

OPERATIONAL RESEARCH DIVISION

CATEGORIES OF PUBLICATION

ORD Reports are the most authoritative and most carefully considered publications of the DGOR scientific community. They normally embody the results of major research activities or are significant works of lasting value or provide a comprehensive view on major defence research initiatives. ORD Reports are approved personally by DGOR, and are subject to peer review.

ORD Project Reports record the analysis and results of studies conducted for specific sponsors. This Category is the main vehicle to report completed research to the sponsors and may also describe a significant milestone in ongoing work. They are approved by DGOR and are subject to peer review. They are released initially to sponsors and may, with sponsor approval, be released to other agencies having an interest in the material.

Directorate Research Notes are issued by directorates. They are intended to outline, develop or document proposals, ideas, analysis or models which do not warrant more formal publication. They may record development work done in support of sponsored projects which could be applied elsewhere in the future. As such they help serve as the corporate scientific memory of the directorates.

ORD Journal Reprints provide readily available copies of articles published with DGOR approval, by OR researchers in learned journals, open technical publications, proceedings, etc.

ORD Contractor Reports document research done under contract of DGOR agencies by industrial concerns, universities, consultants, other government departments or agencies, etc. The scientific content is the responsibility of the originator but has been reviewed by the scientific authority for the contract and approved for release by DGOR.

DEPARTMENT OF NATIONAL DEFENCE

CANADA

OPERATIONAL RESEARCH DIVISION

DIRECTORATE OF OPERATIONAL RESEARCH (CORPORATE AIR MARITIME)

AORT RESEARCH NOTE RN-9701

OPERATIONAL EQUIPMENT RISK ASSESSMENT MODEL (OERAM) - CONCEPT DEVELOPMENT (U)

by

P.E. DESMIER & MAJ. C.F. EIDT

Recommended by: Approved by:

Dr. P.E. Desmier
D Air OR

G. Moscrip
DOR(CAM)

Directorate Research Notes are written to document material which does not warrent or require more formal publication. The contents do not necessarily reflect the views of ORD or the Canadian Department of National Defence.

OTTAWA, CANADA FEBRUARY 1997

ABSTRACT

This research note documents a briefing that was given at the Air Command Council (ACC) meeting on 28 January 1997 at Air Command Headquarters in Winnipeg. The briefing outlined the concept for the development of the "Operational Equipment Risk Assessment Model" or OERAM which would use risk analysis to assess the risk of materiel shortages based on the activation of air force operational plans but also taking into consideration national tasks and support requirements. OERAM would therefore work in parallel with its predecessor OPRAM to globally assess the risk of air force materiel and personnel shortages in the short or long term.

At the ACC meeting, further development of the OERAM model was approved by the Commander, Air Command. Sponsorship of the project will be assumed by the Director General Aerospace Equipment Program Management (DGAEPM).

RÉSUMÉ

La présente note de recherche documente un briefing donné lors d'une réunion du Conseil du Commandement aérien (CCA) tenue le 28 janvier 1997 au Quartier général du Commandement aérien à Winnipeg. Le briefing dressait les grandes lignes du concept portant sur l'exploitation du "Modèle d'évaluation des risques concernant l'équipement opérationnel ou OERAM. Ce modèle utiliserait l'analyse de risque pour déterminer le risque de pénurie de matériel découlant de la mise en oeuvre des plans opérationnels de la force aérienne, tout en prenant en considération les missions nationales et les besoins en matière de soutien. OERAM travaillerait donc de concert avec son prédécesseur OPRAM afin d'évaluer globalement le risque de pénurie de matériel et de personnel au sein de la force aérienne à court et à long terme.

Lors de la réunion du CCA, le commandant du Commandement aérien a approuvé d'autres applications du modèle OERAM. Le parrainage du projet sera assumé par le Directeur général - Gestion du programme d'équipement aérospatial (DGGPEA).

OPERATIONAL EQUIPMENT RISK ASSESSMENT MODEL (OERAM) - CONCEPT DEVELOPMENT

Background

1. On 27 October 1994, the Operational Personnel Risk Assessment Model (OPRAM) was first briefed to Air Force Generals and Wing Commanders at the Combined Commanders Training Session (CCTS) at Air Command Headquarters in Winnipeg. Since then, the model has been used extensively in the budget reduction process to assess the impact of large scale personnel reductions on the ability of the Air Force to support and sustain deployments. Until an endstate for such large scale reductions is reached, the OPRAM model will continue to be utilized as "... the primary tool in a methodology which would assist us in scientifically optimizing the personnel structure of the air force for the tasks assigned by the December '94 White Paper on Defence" [3185-1 (Comd) 8 Dec 95].

2. The proposal to develop an equipment based risk model is intended to apply the lessons learned with OPRAM to the Force Generation/Materiel process. The advantages of applying a risk modeling methodology to resource requirements were plainly evident during the implementation of OPRAM . The ability to develop a sound, essentially irrefutable summary of requirements which could be directly related to government direction and policy was invaluable. The power of the leveling algorithms provided the means to quickly and accurately determine the optimum mix of MOCs (Military Occupation Codes) required to meet CC3 commitments.

3. The Operational Equipment Risk Assessment Model (OERAM) will provide force generation planners an invaluable perspective into CC3 resource requirements and a consistent structure against which materiel requirements and the distribution of Capital and O&M funding envelopes can be evaluated. Future developments include imbedding RECAP (Resources and Capabilities) evaluation and/or reporting features within this process.

Concept

4. OERAM is envisaged as being developed using the same principles used for OPRAM. In fact, one of the most advantageous features of this coordinated approach will be the ability to draw correlation's between the materiel and personnel requirements and the development of analytical tools or methodologies to evaluate the impact of decisions made in either process. The OERAM process will consist of the following steps:

Activity	Tool/Source/Output	Accountable Process
Data collection	Capability Planning Tool/DGAEPM	Strategic Direction (CAD)
Commander's Assessment*	CAS/CAD Guidance (Business Plan)	Strategic Direction (CAS)
Risk Assessment	OERAM (Risk Engine and Graphs)	Strategic Direction (CAS)
Long Term Capital Program Requirements for a given % Risk	OERAM (macro fleet sizes/equip qty etc.)	Strategic Direction (CAS)/ Force Generation Materiel
Recommended funding levels for the Long Term Capital Program for a given % Risk	OERAM (leveling algorithm)	Strategic Direction (CAS)/ Force Generation Materiel
Recommended O&M Funding Distribution	OERAM (leveling algorithm)	Force Generation Materiel
Finalized Resource (Allocations by wing/organization)	CAS/CAD Guidance Document	Strategic Direction

*Note: This is the same assessment that is used for OPRAM and is institutionalized within the business planning process. CAS = Chief of Air Staff; CAD ⇒ 1 CAD = One Canadian Air Division.

5. The OERAM analytical engine is intended to work at two distinct levels of detail, the first being at the macro level, determining in broad terms the overall requirement for equipment or weapon systems. The second level of detail would establish the optimum number and type of sub-systems required within a specific weapon system or capability. An example of this second level analysis would be determining the optimal contents/quantities for MPA pack-up kits or the optimal number of EW suites for the CC130 or CH146 fleets (currently fitted-for-but-not-with). The assessment of the impact on the macro risk level of failing to provide these optimized sub-systems would become part of the RECAP reporting and analysis process.

Sustainability/Workload

6. The concept of risk assessment and automated resource leveling tools is already well established within CC3 and significant interest has been generated within agencies outside the air force. With respect to sustainability, a good deal of effort has been expended ensuring the long term sustainability of OPRAM; effort which will directly benefit OERAM. The equipment/weapon system requirements for each task or operational plan (OPLAN) are being collected and maintained by the CAD planning staffs using the Capability Planning Tool in support of OPLAN development and OPRAM related activities. The interface into the business planning process is under development and will require little effort to include OERAM (provision for OERAM was included in the initial planning).

7. Staff reductions are now being felt in the day to day operations of the strategic and operational headquarters. APS 97 will see the formation of the CAS & 1 CAD/CANR and we will be effectively at endstate for headquarters personnel. From the perspective of substantiation of the capital program alone, OERAM will significantly reduce the staff time required to research and substantiate capital projects. OERAM will also go a long way to relieving a much smaller staff of many of the time consuming and tedious steps involved in managing the allocation of capital and O&M funding. Finally OERAM will also provide a means to integrate readiness/RECAP considerations into capital and O&M planning giving the Commander and his advisors a much needed tool to assist them in positively influencing the future of the air force.

THIS PAGE INTENTIONALLY LEFT BLANK

SLIDE 1

8. LGen DeQuetteville, Gentlemen; this briefing outlines our concept for the development of the "Operational Equipment Risk Assessment Model" or OERAM (pronounced O-RAM). After you hear the briefing, I would be most interested in your views, and those of the members, regarding the concept and how you feel the model could be used to assist the Air Force in the decision making process.

Operational Equipment Risk Assessment Model (OERAM)

Operational Research/CAS Shadow

Dr. P.E. Desmier (996-8440) & Maj. C.F. Eidt (996-2284)

SLIDE 1

SLIDE 2

9. As you know it was Operational Research in Air Command that developed the "Operational Personnel Risk Assessment Model" to assess the risk of air force personnel shortages based on our operational requirements. The concept of OPRAM was to develop an analytical framework of air force personnel shortages taking into account our operational plans, national tasks and support requirements. We perceive a similar modelling concept for OERAM but where OPRAM dealt with personnel resources, OERAM would deal with materiel resources. In fact, as this slide indicates, the actual planning assumptions that drive OPRAM, would also drive OERAM.

Resource Modelling Concept

Contingency Plans
National Tasks
Support Rqmt's

Planning Assumptions

Materiel Resources (OERAM)

Personnel Resources (OPRAM)

SLIDE 2

SLIDE 3

10. Our vision for the success of OERAM is based essentially on the success of OPRAM which has proven the advantages of a bottom-up resource based modelling process which is tied directly to Government Policy, Strategic Direction and a Commander's assessment of risk. Also, given the leverage that OPRAM has provided the air force within the Force Generation/Personnel process, it stands to reason that a similar approach would bear comparable results within the Force Generation/Materiel process. It should be emphasized that OERAM will be developed using exactly the same principles that were used in the development of OPRAM.

P502226.PDF [Page: 17 of 38]

VISION

- *The success of OPRAM has proven the advantages of a bottom-up resource based modelling process which is tied directly to Government Policy, Strategic Direction and a Commander's assessment of risk.*

- *Given the leverage that OPRAM has provided the air force within the Force Generation/Personnel process, it stands to reason that a similar approach would bear comparable results within the Force Generation/Materiel process.*

OERAM WILL BE DEVELOPED USING THE SAME PRINCIPLES USED FOR OPRAM

SLIDE 3

SLIDE 4

11. Our concept for OERAM is that it will address materiel requirements at two distinct levels or what we call phases in the project development.

12. At the first level or phase 1, the modelling will focus on the major weapon systems. The results of this part of the analysis should answer questions such as: How many CF-18's or CC130's do we need in order to fulfil our operational requirements? Or conversely, what can we not accomplish with our current resources.

13. At the second level or phase 2, the modelling will focus on sub-systems or high-end consumables such as the number of EW suites, maintenance pack-up kits, PGMs etc. The results of this part of the analysis should underline the deficiencies in our current stocks.

CONCEPT

It is envisioned that OERAM will address materiel requirements at two distinct levels (phases of project development)

- *FIRST LEVEL (PHASE 1): Weapon System & Major Equipment*
- *SECOND LEVEL (PHASE 2): Sub-systems or High-end Consumables, i.e., EW Suites, Maintenance Pack-up Kits, PGMs etc.*

SLIDE 4

SLIDE 5

14. To give you some more details, at the weapon system level, OERAM would provide a quantitative overall assessment of risk of not being able to activate the required OPLANs based on current materiel allocations. Essentially, like OPRAM, we would use risk assessment as a measure of our ability to generate combat ready forces.

15. OERAM would also provide the recommended quantities of each weapon system required to reduce the level of risk directly in-line with the commander's overall assessment of risk as specified in OPRAM.

16. OERAM should also be able to recommend how capital and/or O&M funding should be optimally distributed through a resource levelling process such that the overall level of risk is reduced.

At the Weapon System Level (Phase 1) OERAM Would Provide:

- *A Quantitative Overall Assessment of Risk of <u>NOT</u> Being Able to Activate the Required OPLANs Based on Current Materiel Allocations*
- *A Determination of Recommended Quantities of Each Weapon System Required to Reduce the Level of Risk*
- *A Recommended Capital and/or O&M Funding Envelope (Resource Levelling) by Weapon System*

SLIDE 5

SLIDE 6

17. At the sub-system level, OERAM would also provide a quantitative overall assessment of risk of not being able to activate the required OPLANs, but now based on sub-system availability. Note that this level of risk of failing to provide the required sub-systems delves into the area of capability assessment and may interface with the RECAP reporting and analysis process.

18. OERAM would also provide the recommended quantities of each weapon sub-system such as the number of EW suites required for the Griffon fleet, maintenance pack-up kit contents or inventory levels required to reduce the level of risk.

19. As for the major weapon systems, OERAM should also be able to recommend how capital and/or O&M funding should be optimally distributed by sub-system such that the overall level of risk is reduced.

At the Sub-System Level (Phase 2) OERAM Would Provide:

- *A Quantitative Overall Assessment of Risk Based on Sub-System Availability***
- *A Determination of Recommended Quantities of Each Sub-System (i.e., # of EW Suites for the CH146 Fleet)*
- *A Recommended Capital and/or O&M Funding Envelope (Resource Levelling) by Sub-System*

SLIDE 6

** *This level of risk assessment delves into the area of capability assessment and may interface with RECAP*

P502226.PDF [Page: 23 of 38]

SLIDE 7

20. The development of OERAM will require the full time efforts of two members of the CAS Shadow team. I would be the model developer using OPRAM as a template for the OERAM structure, and Maj. Fred Eidt of the Directorate of Air Strategic Plans would be required during the project definition phase; also to develop the interface between the Capability Planning Tool (which includes all the required data for the OPLANs, National Tasks and support) and the OERAM model. He and I both would be required in the final phase of model testing and implementation.

21. Since BGen Morin (DGAEPM) has kindly agreed to sponsor the project, we would also require assistance from his staff to help us clarify exactly what questions we want this model to answer; and to help us gather the input data for both Phases 1 and 2.

P502226.PDF [Page: 25 of 38]

Personnel Required for Development

- *Dr. P.E. Desmier - Model Developer (0.5 PY)*
- *Maj. C.F. Eidt - Project Defn., CPT/OERAM Interface, Model Testing and Implementation (0.4 PY)*
- *Sponsor Staff - Project defn. Sessions, Data Gathering, Coord. Meetings, etc.*

SLIDE 7

SLIDE 8

22. The milestones for Phase 1 show approximately seven months from signing the DGOR Project Control Form to project completion. These include four weeks for the project definition phase; four months for model development (including data input); two weeks for model testing and debugging; two weeks for data transfer and validation; and three weeks for full documentation.

23. Scheduling the implementation of the Macro Level of OERAM is dependent on several factors such as the timeliness of a formal tasking, priorities within the CAS Shadow and most critical, the availability of the baseline data. It is feasible to proceed immediately with the development of the model, however a specific milestone for the provision of the baseline data from DCOS P&R has not been established. Currently the plans staff are in the midst of fielding the Capability Planning Tool (CPT) which will be the primary data collection tool for all operational personnel and equipment requirements. As part of the CPT testing process, three OPLAN sub-options will be populated with the requisite personnel and equipment requirements. Once validated these data elements will provide approximately 40 percent of the data required for implementation of OERAM. If given an adequate level of priority it is entirely feasible that the remaining data can be collected to coincide with the development and testing of OERAM.

24. Note: This possible schedule assumes that approval (if required) of business rules and assumptions will not delay development and that development of the CPT/OERAM interface will be tasked and developed concurrently.

TIMELINES

Phase 1

- *Project Defn - 4 Weeks*
- *Model Development - 4 Months*
- *Model Testing and Debuging - 2 Weeks*
- *Data Transfer and Validation - 2 Weeks*
- *Documentation - 3 Weeks*

Total: Approx. 7 Months

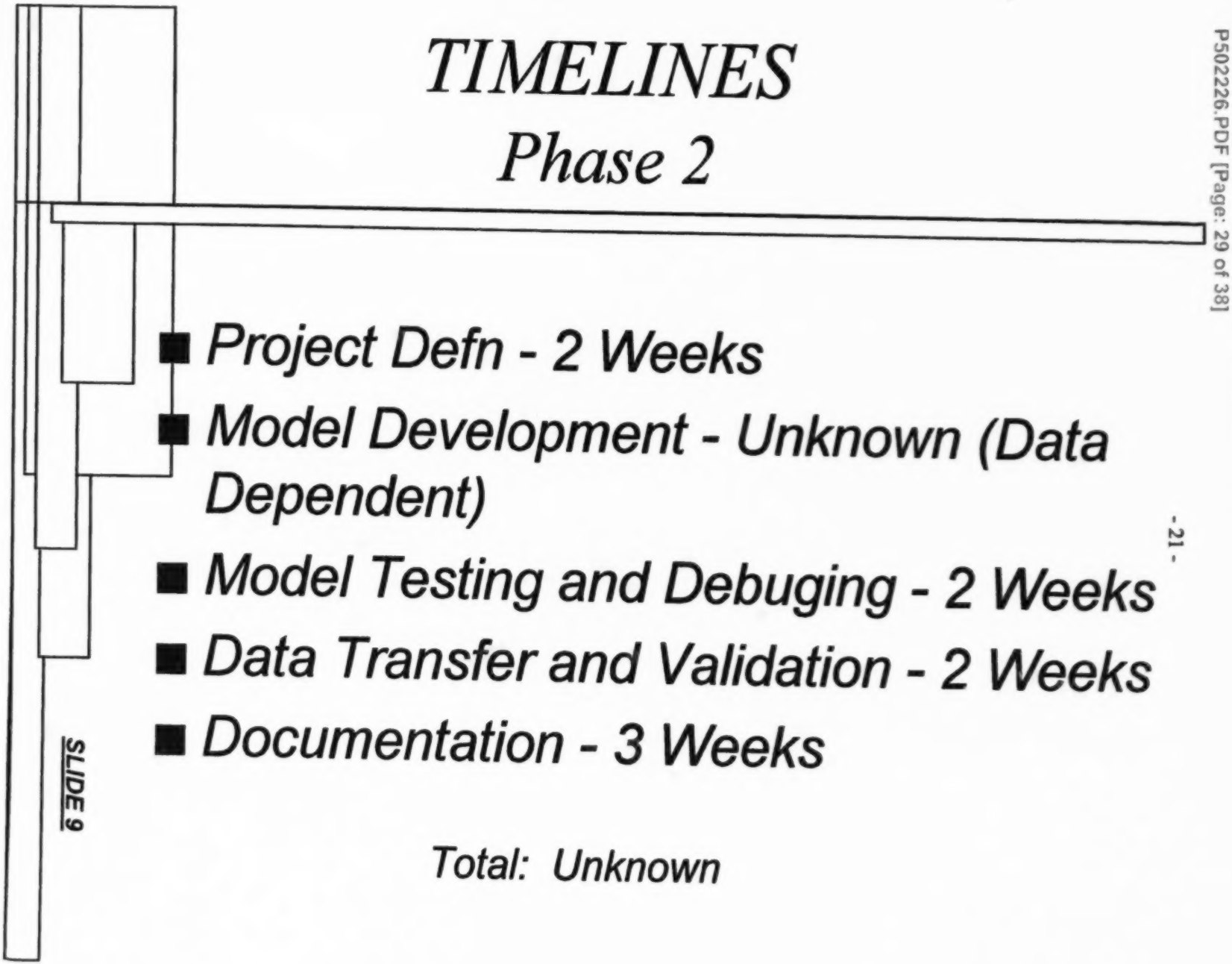
SLIDE 8

P502226.PDF [Page: 27 of 38]

SLIDE 9

25. For Phase 2, the milestones are slightly more nebulous which is largely data dependent. We need a great deal of data for Phase 2 and we have to make sure that it is accurate and reliable. If we are going to hang our hat on this model, it won't be just the "garbage-in, garbage-out" syndrome that we would be concerned with. If the input data is inaccurate, the output could do us more harm than good in the long term.

26. Implementation of the sub-system version of OERAM can and should be developed independently of the macro model. Consequently these models can be developed at any time to look at the specific requirements of an individual weapon systems or kits.



TIMELINES
Phase 2

- *Project Defn - 2 Weeks*
- *Model Development - Unknown (Data Dependent)*
- *Model Testing and Debuging - 2 Weeks*
- *Data Transfer and Validation - 2 Weeks*
- *Documentation - 3 Weeks*

Total: Unknown

SLIDE 9

P502226.PDF [Page: 29 of 38]

SLIDE 10

27. This slide shows where OPRAM and OERAM stand in the CC3 Resource, Guidance and Analysis Process.

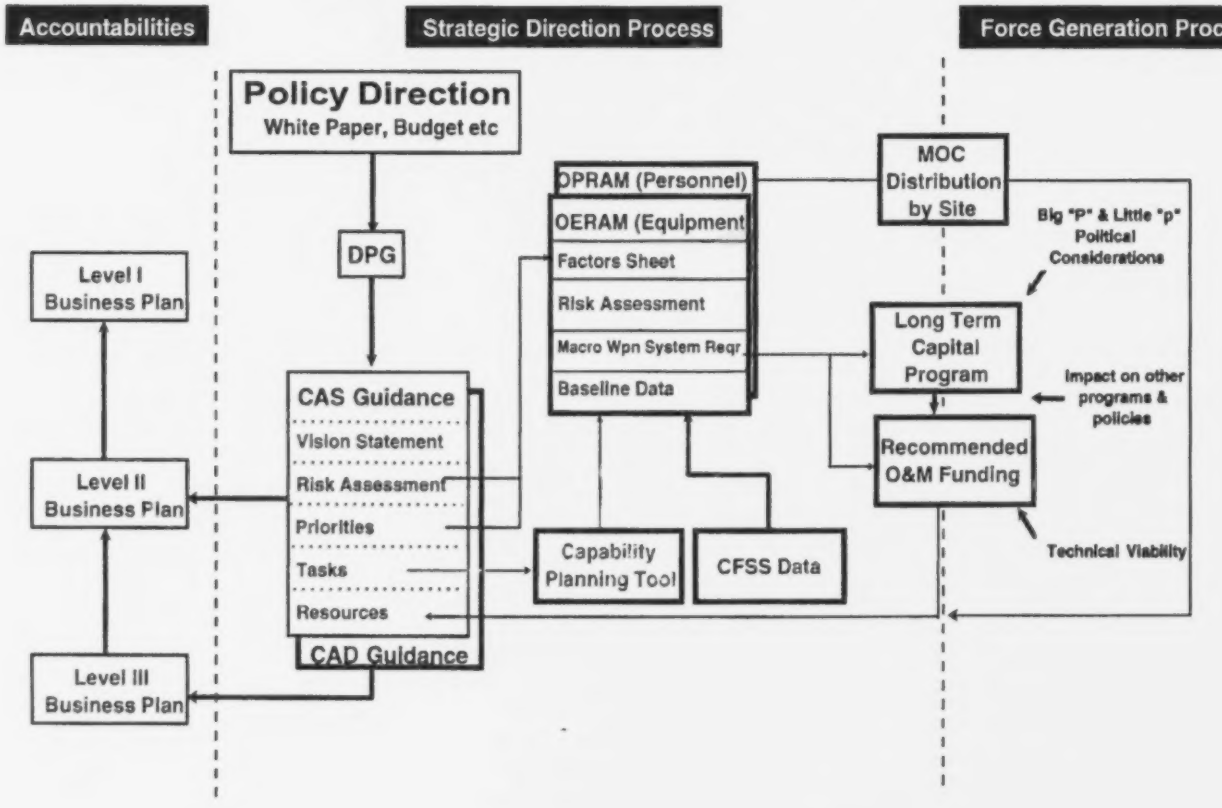
28. There are three sections depicted in this chart: Accountabilities, the Strategic Direction Process and the Force Generation Process. The dark-green items depict our business planning documents through which we are accountable for the provision of combat ready air forces.

29. Under strategic direction (dark-blue), policy direction is promulgated through the DPG into CAS guidance. The Commander's assessment of risk, or the probabilities and priorities of OPLAN activation become an integral part of the OPRAM and OERAM (dark-red) planning assumptions which drive the risk analysis engine. The Capability Planning Tool and Canadian Forces Supply System (CFSS) data (light-green) are the enabling applications which, in the case of the former, provide all the baseline input data for what materiel (and personnel) resources we require to activate the OPLANs, national tasks and maintain a support base. In the case of the later, CFSS data, if it can be provided in a reliable and accurate format, will provide the input data for what we currently have available to draw materiel resources from.

30. Under Force Generation, output from the OPRAM and OERAM guidance and analysis tools will provide input to: MOC distribution by site as we downsize to a 13,439 personnel endstate; long term capital program as part of the macro optimizing of capital funding; and a recommended O&M funding envelope as part of phase 2 in the analysis process of the OERAM model.

31. The OERAM model also allows for outside inputs tempering with other considerations. This is reflected by the vertical dotted line delineating strategic direction from force generation. It should also be stressed that the model output is not directive and that changes are expected before being included as resource allocations in the guidance documents.

C3 Resource, Guidance and Analysis Process



SLIDE 10

Business Planning Documents | Strategic Direction Documents | Guidance and Analysis Tools | Enabling Applications

SLIDE 11

32. Finally, this slide shows some of the many attributes that describe the utility of the OERAM model.

a. Firstly, it is envisaged that OERAM will have a greater impact on the ability of the Air Force to generate forces than OPRAM had on the personnel world. At any level of risk, if OPRAM says we have sufficient personnel to activate multiple OPLANs, than we have to ensure that OERAM says we have enough materiel resources at the same level of risk.

b. OERAM will provide a sound and consistent reference point on a constantly changing playing field.

c. With all the downsizing that we have been subjected to, OERAM methodology will provide a significant productivity boost to our ever dwindling staffs. OERAM will go a long way to relieving our much smaller staffs of many of the time consuming steps involved in managing the allocation of capital and O&M funding. Implementation of OERAM will require the equivalent of one PY and the support of senior management to initiate the data collection to make OERAM a reality. The long term impact on manning levels is an overall reduction in workload on a scale which is unprecedented.

d. A coordinated approach to our overall resource requirements will allow the Air Force to stand its ground and rationally defend its position in future budget cuts. OERAM and OPRAM will always provide a quantifiable rationale to justify any decisions we have to make regarding any future budget cuts.

e. When further cuts are unavoidable, tools such as OERAM and OPRAM will allow the staff to recommend to the Commander those areas which would minimize the impact on our ability to generate combat ready forces.

33. OERAM has been intended from inception to become an institutionalized part of the business planning process within CC3. Sustainability and long term support are essential to bring the project to fruition.

OERAM ATTRIBUTES

- *OERAM will have a greater Impact on the ability of the Air Force to generate forces than OPRAM had on personnel*
- *Provide a sound and consistent reference point on a constantly changing playing field*
- *OERAM methodology will provide a significant productivity boost to our ever dwindling staffs*
- *A coordinated approach to our overall resource requirements will allow the Air Force to stand its ground and rationally defend its position in future budget cuts*
- *When further cuts are unavoidable, tools such as OERAM and OPRAM will indicate those areas which would minimize the impact on our ability to generate combat ready forces*

SLIDE 11

UNCLASSIFIED
SECURITY CLASSIFICATION OF FORM
(highest classification of Title, Abstract, Keywords)

DOCUMENT CONTROL DATA
(Security classification of title, body of abstract and indexing annotation must be entered when the overall document is classified)

1. ORIGINATOR (the name and address of the organization preparing the document. Organizations for whom the document was prepared e.g. Establishment Sponsoring a contractor's report, or tasking agency, are entered in Section 8).

Operational Research Division
Department of National Defence
Ottawa, Ontario K1A 0K2

2. SECURITY CLASSIFICATION (overall security classification of the document, including special warning terms if applicable)

UNCLASSIFIED

3. TITLE (the complete document title as indicated on the title page. Its classification should be indicated by the appropriate abbreviation (S, C or U) in parentheses after the title)

Operational Equipment Risk Assessment Model (OERAM) - Concept Development

4. AUTHORS (last name, first name, middle initial)

Desmier, P.E. and Eidt, Maj C.F.

5. DATE OF PUBLICATION (month Year of Publication of document)

February 1997

6a. NO OF PAGES (total containing information. Include Annexes, Appendices, etc.)

27

6b. NO OF REFS (total cited in document)

0

7. DESCRIPTIVE NOTES (the category of document, e.g. technical report, technical note or memorandum. If appropriate, enter the type of report e.g. interim, progress, summary, annual or final. Give the inclusive dates when a specific reporting period is covered.)

Research Note

8. SPONSORING ACTIVITY (the name of the department project office or laboratory sponsoring the research and development. Include the address).

DGAEPM, CFB Ottawa (North)

9a. PROJECT OR GRANT NO. (if appropriate, the applicable research and development project or grant number under which the document was written. Please specify whether project or grant.)

9b. CONTRACT NO. (if appropriate, the applicable number under which the document was written.)

10a. ORIGINATOR's document number (the official document number by which the document is identified by the originating activity. This number must be unique to this document.)

AORT Research Note RN-9701

10b. OTHER DOCUMENT NOS. (Any other numbers which may be assigned this document either by the originator or by the sponsor.)

---

11. DOCUMENT AVAILABILITY (any limitations on further dissemination of the document, other than those imposed by security classification.)

(X) Unlimited distribution
( ) Distribution limited to defence departments and defence contractors: further distribution only as approved
( ) Distribution limited to defence departments and Canadian defence contractors; further distribution only as approved
( ) Distribution limited to government departments and agencies; further distribution only as approved
( ) Distribution limited to defence departments; further distribution only as approved
( ) Other (please specify):

12. DOCUMENT ANNOUNCEMENT (any limitation to the bibliographic announcement of this document. This will normally correspond to the Document Availability (11). However, where further distribution (beyond the audience specified in 11) is possible, a wider announcement audience may be selected.)

UNCLASSIFIED
SECURITY CLASSIFICATION OF FORM

13. ABSTRACT (a brief and factual summary of the document. It may also appear elsewhere in the body of the document itself. It is highly desirable that the abstract of classified documents be unclassified. Each paragraph of the abstract shall begin with an indication of the security classification of the information in the paragraph (unless the document itself is unclassified) represented as (S), (C), or (U). It is not necessary to include here abstracts in both official languages unless the text is bilingual).

This research note documents a briefing that was given at the Air Command Council (ACC) meeting on 28 January 1997 at Air Command Headquarters in Winnipeg. The briefing outlined the concept for the development of the "Operational Equipment Risk Assessment Model" or OERAM which would use risk analysis to assess the risk of materiel shortages based on the activation of air force operational plans but also taking into consideration national tasks and support requirements. OERAM would therefore work in parallel with its predecessor OPRAM to globally assess the risk of air force materiel and personnel shortages in the short or long term.

At the ACC meeting, further development of the OERAM model was approved by the Commander, Air Command. Sponsorship of the project will be assumed by the Director General Aerospace Equipment Program Management (DGAEPM).

14. KEYWORDS, DESCRIPTORS or IDENTIFIERS (technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document. They should be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included. If possible keywords should be selected from a published thesaurus, e.g. Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus-identified . If it is not possible to select indexing terms which are Unclassified, the classification of each should be indicated as with the title.)

OPRAM
OERAM
Materiel
Equipment
Risk Analysis
Monte Carlo
Simulation
Operations
Operational Research
Statistics